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The Effect of Voltage Ramp Rate on Dielectric Breakdown of Thin Film Polymers ANTHOMAS THOMAS, J. DENNISON, STEVE HART, RYAN HOFFMANN, USU, USU SURFACE SCIENCE GROUP TEAM — When a sufficient electric field is placed across a dielectric material, electrical breakdown occurs. The field strength at which this occurs is referred to as the dielectric strength or electrostatic discharge (ESD) voltage. The dielectric strength of thin (25 μm to 250 μm) film polymer samples (low density polyethylene, Teflon, Kapton, Mylar, and other fluorocarbon polymers) have been measured by placing them between parallel plate electrodes and increasing the voltage until breakdown occurs across the dielectric barrier creating a path for the flow of large discharge currents. The results are affected by the rate at which the applied potential is increased and the incremental increases. Rates between 20 V/s and 500 V/s and voltage increments between 10 V and 500 V have been studied. Larger rates cause a premature breakdown compared to a slower ramping speed. This may be due to a kind of conditioning of the sample; the stress of the high voltage is easier to handle if taken in small increases.

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